

WMA Mini-Grant Research Project Proposal

UC Regents of the University of California
Central Sierra Partnership Against Weeds (WMA group)
January 1, 2011-December 31, 2011

Contract Lead Group and Contact Person(s) (name, phone number, email, and address):

The Regents of the University of California
Division of Agriculture and Natural Resources
Lynn Deetz, Director
Office of Contracts and Grants
ANR Building Hopkins Road
University of California
Davis, CA 95616
lynn.deetz@ucop.edu
(530) 752-7875

Project Lead(s) for project and contract reporting and invoicing: (name, phone number, email, and address):

Scott Oneto
University of California Cooperative Extension
2 S. Green Street
Sonora, CA 95370
sroneto@ucdavis.edu
(209) 533-5686

This project is in affiliation with what WMA group or groups?

Central Sierra Partnership Against Weeds

List what other Noxious and Invasive Weed Research has been conducted by you or your group:

Developed chemical and mechanical control strategies for *Cytisus scoparius* (Scotch broom)
Developed chemical and mechanical control strategies for *Nicotiana glauca* (tree tobacco)
Developing chemical control strategies for big periwinkle (*Vinca major*)
Developing chemical control strategies for hedgeparlsey (*Torilis arvensis*)
Developing chemical control strategies for *Taeniantherum caput-medusae* (medusahead)

Proposed Project(s)

Project Title:

Developing control strategies for the invasive weed *Cynoglossum officinale* (houndstongue)

Mini-Grant Project Goal (1/2 page max)

Houndstongue (*Cynoglossum officinale*), or dog bur, is a noxious weed infesting rangelands, pastures, forested areas, crop lands, and waste places throughout much of North America. Native to Eurasia, houndstongue was accidentally introduced in the late 1800s as a seed contaminant in cereal grain. Houndstongue occurs throughout the contiguous United States, in all but five southern states. Since its introduction, it has become a serious problem throughout much of Canada and the United States and has been declared a noxious weed in two Canadian provinces and six U.S. states. Houndstongue is currently only found in a few isolated locations in California. In addition to being highly invasive and an aggressive competitor with native and desirable species, houndstongue is poisonous to cattle and horses. Livestock usually avoid houndstongue in pastures or rangelands due to its distinct odor and unpalatability. However, toxicity can occur when the plant is a contaminant of hay or in areas with high density grazing. This research will develop control strategies that ranchers, landowners and land managers can use to control this invasive weed and prevent further spread.

What are the project's long-term benefits and/or local, regional or statewide significance (8 sentence Max):

Houndstongue is an aggressive weed that can quickly colonize an area and form dense monotypic stands. By developing effective control strategies, landowners and land managers in California can take a proactive approach and prevent the further spread of houndstongue in the state. In addition to providing needed research, this project will provide a platform to educate landowners and land managers about houndstongue identification and how to control it effectively.

Priority Topic Area Being Addressed (from request for proposal announcement, 8 sentence Max):

Little to No Management Research Conducted to Date.

Prior research has shown that picloram, 2,4-D dimethylamine salt, metsulfuron, chlorsulfuron, imazapic, and dicamba will control houndstongue when applied at the rosette stage. Picloram, metsulfuron, and imazapic are not registered for use in California, while 2,4-D dimethylamine salt and dicamba are restricted use materials, making it difficult for ranchers and land managers to apply without the proper license. In 2004 I began testing multiple herbicides for the control of houndstongue. The data looks promising, but additional work needs to be done. This research will further examine the efficacy of multiple herbicides, including low risk and selective herbicides for the control of houndstongue. This research will test the following herbicides; Arsenal® (imazapyr), Telar DF® (chlorsulfuron), Garlon 4® (triclopyr ester), Roundup Pro® (glyphosate), Amine 4® (2,4-D dimethylamine salt) and Milestone® (aminopyralid), Milestone VM Plus® (aminopyralid + triclopyr), Matrix® (rimsulfuron), and Landmark® XP (sulfometuron + chlorsulfuron).

Describe your in-kind contributions toward research project(s) (4 sentence max):

In-kind contributions will be comprised of salaries from the primary investigator, and equipment including, sprayer equipment, GPS unit and other miscellaneous field supplies.

Mini-grant Project Objectives, Tasks and Methods

OVERALL OBJECTIVE (4 sentence Max):

The objective of this study is to test the efficacy of multiple herbicides for control of houndstongue. Herbicides were chosen based on registration for use in California, possible selectivity with neighboring vegetation, and availability to ranchers and land managers. The goal is to provide land managers and land owners with a practical and effective control option for the management of houndstongue.

Task 1 (2 sentence Max):

Establish test plots and apply herbicides. This trial will test the following herbicides; Arsenal® (imazapyr), Telar DF® (chlorsulfuron), Garlon 4® (triclopyr ester), Roundup Pro® (glyphosate), Amine 4® (2,4-D dimethylamine salt) and Milestone® (aminopyralid), Milestone VM Plus® (aminopyralid + triclopyr), Matrix® (rimsulfuron), and Landmark® XP (sulfometuron + chlorsulfuron)

Methods (8 sentence Max)-

Plots will measure 10 ft x 20 ft and each treatment will be replicated 4 times in a complete randomized block design. Treatments will be made in late summer / early fall just prior to dormancy when carbohydrates from the leaves are translocating into the root system. Treatments will be applied using a CO₂ backpack sprayer delivering 20 gal/acre through a boom sprayer comprised of four 8002 nozzles at 30 psi. All treatments will be applied in water, with 0.25% Activator 90® v/v. Plots will be flagged at each corner and the coordinates recorded using GPS. Herbicides will be applied in the fall of 2010 and evaluated in the spring of 2011.

Task 2 (2 sentence Max):

Apply native forb/grass seed mix to site after trial.

Methods (8 sentence Max)-

To lessen the reinvasion potential of houndstongue and/or other invasive plants at the research site, I will broadcast a native forb/grass seed mix after the trial. The research site is a mixed conifer forest comprised of limited herbaceous forbs and grasses. By broadcasting a native seed mix after the trial, any bare ground or areas that were once occupied by houndstongue can be potentially filled by a more desirable species.

Performance Measures

How will you assess and/or analyze your results (8 sentence Max)?

Trials will be evaluated one year after application. Houndstongue is a biennial, meaning it doesn't flower, set seed and senesce until the second year. Treatments will be made in the fall. To determine postemergent control, a visual assessment will be made by counting the number of flowering plants the following year. Any flowering plants observed in the treated plots indicate herbicide failure or poor control. Preemergent activity will be evaluated by counting the number of new rosettes in each plot the following season. All treatments will be compared with corresponding untreated control plots. Data will be analyzed using analysis of variance with a confidence interval of 0.05. Once the herbicide trial is complete the research plots will be reseeded with a native forb/grass seed mix. In the spring

after planting, presence/absence data will be taken as well as percent cover. Depending on future funding, additional data may be gathered and analyzed.

How will your results be disseminated (4 sentence Max)?

The results will be compiled and disseminated locally through the weed management area contact lists, local organizations such as farm bureau and cattlemen/cattlemen associations, and to other agencies. The information will also be submitted to statewide newsletters such as Cal-IPC and the California Weed Science Society. A manuscript will also be submitted to the Journal of Invasive Plant Science and Management. A PowerPoint presentation will also be developed to be given at multiple invasive plant workshops or venues.